

**ABSTRACT**

[0094] A method for monitoring the condition of a heating element involving installing the heating element in a location and setting the initial composition  $C_i$  of the material as a reference baseline at an initial time  $T_i$  corresponding to said installation of the heating element. Data is then collected reflecting the subsequent composition  $C_s$  of the heating element material after a subsequent time  $T_s$  at the installed location and any change in the material composition of the heating element between  $T_i$  and  $T_s$  is monitored. An alarm is sent when the change reaches a threshold value indicating a possible failure condition. According to one embodiment, an impedance monitor is provided that calculates and compares impedance at the required levels of accuracy to determine changes in material composition. The impedance monitor, or portions thereof can be embedded within a microcontroller for increased portability and functionality.